

Laboratory Universal Cables Limited, EHV Cable Laboratory, P.O. Birla Vikas, Satna, Madhya Pradesh

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6464 (in lieu of T-2043)

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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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ELECTRICAL TESTING

I.	CABLES & WIRES			
1.	EHV/MV Cables	Partial Discharge	IEC-6050-2 (Clause 16.3 & 18.1.4) IEC-60840 (Clause 9.2 & 12.4.4) IEC-62067 (Clause 9.2 & 12.4.4) IS 7098 (Part-2) (Clause 20.2) IS 7098 (Part-3) (Clause 20.10)	2 pC to 500 pC
		High Voltage	IEC-60502-2 (Cl. 16.4 ,17.9 & 18.1.8) IEC 60840 (Clause 9.3) IEC 62067 (Clause 9.3) IS 1554 (Part-2) (Clause 19.7) IS 7098 (Part-2) (Clause 20.7) IS 7098 (Part-3) (Clause 20.17)	1 kV to 450 kV
		Tan Delta / Dielectric Power Factor	IEC 60502-2 (Clause 18.1.5) IEC60840 (Clause 12.4.5) IEC62067 (Clause 12.4.5) IS 7098 (Part-2) (Clause 20.4) IS 7098 (Part3) (Clause 20.12 & 20.13)	10 ⁻⁵ to 10 ⁻³
		Capacitance	IEC 60840 (Clause 10.10) IEC 62067 (Clause 10.10)	10 pF to 40 nF

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			IS 7098 (Part-3) (Clause 20.12)	
		Impulse Voltage	IEC 60502-2 (Clause 18.1.7) IEC 60840 (Clause 12.4.7) IEC 62067 (Clause 10.12, 12.4.7.1 & 12.4.7.2) IS 7098 (Part-2) (Clause 20.6) IS 7098 (Part-3) (Clause 20.15)	1 kV to 1600 kV
		Heating Cycle Voltage / Load Cycle	IEC 60502-2 (Clause 18.1.6) IEC 60840 (Clause 12.4.6) IEC 62067 (Clause 12.4.6) IS 7098 (Part-2) (Clause 20.5) IS 7098 (Part-3) (Clause 20.14)	1 kV to 450 kV 1 °C to 105 °C
		DC Voltage (Electrical test on over sheath)	IEC 60840 (Clause 9.4) IEC 62067 (Clause 9.4)	1 kV to 30 kV
		Bending	IEC 60502-2(Clause 18.1.3) IEC 60840 (Clause 12.4.3) IEC 62067 (Clause 12.4.3) IS 7098 (Part-2) (Cl. 20.3) IS 7098 (Part-3) (Cl. 20.11)	Qualitative (Mandrel Dia: 650 mm to 5200 mm)
		Resistivity of semiconducting screen	IEC 60502-2 (Cl. 18.1.9.2) IEC 60840 (Clause 12.4.9) IEC 62067 (Clause 12.4.9) IS 7098 (Part-2) (Cl. 20.9) IS 7098 (Part-3) (Cl. 20.2)	0.115 Ω-m to 999.915 Ω-m
		Water Penetration / Longitudinal Water Tightness	IEC 60502-2 (Cl. 19.22) IEC 60840 (Cl. 12.5.14) IEC 62067 (Cl. 12.5.14)	1 °C to 105 °C

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2.	MV/LV Cables	Insulation Resistance / Volume resistivity on insulation	IS 7098 (Part-3) (Cl. 20.8.1) IEC 60502-1 (Cl.17.1) IS 7098 (Part-1) (Cl. 15.1 f) IS 7098 (Part-2) (Cl. 19.1 xi) IS 1554 (Part-1) (Cl. 15.1e) IS 1554 (Part-2) (Cl. 18.1f) IS 9968 (Part-1) (Cl. 21.1) IS 9968 (Part-2) (Cl. 22.1d)	$1 \times 10^8 \Omega\text{-cm}$ to $1 \times 10^{17} \Omega\text{-cm}$
3.	LV Cables	High Voltage Test	IEC 60502-1 (Clause 15.3) IS 1554 (Part-1) (Cl. 16.2) IS 7098 (Part-1) (Cl. 16.2) IS 9968 (Part-1) (Cl. 22.2) IS 9968 (Part-2) (Cl.23.7.3)	0.1 kV to 10 KV
		DC High Voltage Test	IS 1554 (Part-1) (Cl. 16.3.2)	0.01kV to 2.5 kV
4.	EHV/MV/LV Cables	Conductor Resistance	IEC 60502-1 (Clause 15.2) IEC 60502-2 (Clause 16.2) IEC 60840 (Clause 10.5) IEC 62067 (Clause 10.5) IS 7098 (Part-1) (Cl. 15.1 iv) IS 7098 (Part-2) (Cl. 19.1d) IS 7098 (Part-3) (Cl.19.1a ii) IS 1554 (Part-1) (Cl. 15.1 a) IS 1554 (Part-2) (Cl. 18.1 a)	1 m Ω to 1800 Ω
		Thickness of Insulation and Sheath	1554 (Part-1) (Cl. 15.1c) IS 1554 (Part-2) (Cl. 18.1c) IS 8783 (Part-4) (Cl. 4.1, 4.4) IS 694 Table-1b IS14452 (Clause 7.2) IS 7098 (Part1) (Cl.15.1 C) IS 7098 (Part-2) (Clause 19.1iv & 12.4) IS 7098 (Part-3) (Clause 19.1b I & g 1, 2 i) IEC 60840 (Cl.12.5) IEC 60502-1 (Cl.18.1,18.2)	0.01 mm to 150 mm

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			IEC 60502-2 (Clause 19.1 & 19.2) IEC 62067 (Cl.10.6)	
		Tensile Strength and Elongation of Insulation and Sheath	IS 1554 (Part-1) (Cl. 15.1d1) IS 1554 (Part-2) (Cl. 18.1d1) IS 8783(Part-4) (Cl. 4.1, iii) IS 694 (Table-1 C1) IS 7098 (Part-1) (Clause 15.1 d I & e i) IS 7098 (Part-2) (Clause 19.1 iii a & vi a) IS 7098 (Part-3) (Clause 19.1 b ii g i) IS 14255 (Table-1 & ii) IEC 62067 (Cl. 12.5) IEC 60840 (Cl. 12.5) IEC 60502-1 (Cl.18.3, 18.4) IEC 60502-2 (Clause 19.3, 19.4, 19.5)	1 N to 500 N 10 % to 90 %
		Hot Set Test of insulation	IS 7098 (Part-1) (Clause 15.1, d iii) IS 7098 (Part-2) (Clause 19.1, iii c) IS 7098 (Part-3) (Clause 19.1, b iv) IEC 60840 (Clause 12.5) IEC 62067 (Clause 12.5) IEC 60502-1 (Cl.18.11) IEC 60502-2 (Cl.19.11)	10 % to 200 %
		Ageing in air oven of insulation and Sheath	IS 1554 (Part-1) (Cl. 15.1d 2) IS 1554 (Part-2) (Cl. 18.1d 2) IS 8783 (Part-4) (Cl. 4.1, iv) IS 694 Table-1c 3 & d3 IS 7098 (Part-1) (Clause 15.1 d ii, e ii)	Qualitative (1 N to 500 N)

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			IS 7098 (Part-2) (Clause 19.1 iii b & vi b & vii) IS 7098 (Part-3) (Clause 19.1biii & g ii & 3 ii) IS14452 Table-1 iii IEC 60840 (Clause 12.5) IEC 60502-1 (Clause 18.3) IEC 60502-2 (Clause 19.3 & 19.4, 19.5) IEC 62067 (Clause 12.5)	
		Shrinkage of Insulation and Sheath	IS 1554 (Part-1) (Cl. 15.1d 3) IS 1554 (Part-2) (Cl. 18.1d 3) IS 8783 (Part-4) (Cl. 4.1, v) IS 694 Table-1c 4 & d 4 IS14452 Table-1 v IS 7098 (Part-1) (Clause 15.1, d iv & e iv) IS 7098 (Part-2) (Clause 19.1 iii d & vi c) IS 7098 (Part-3) (Clause 19.1b v & g vi) IEC 60840 (Clause 12.5) IEC 60502-1 (Clause 18.16, 18.20) IEC 60502-2 (Clause 19.16 & 19.20)	Up to 10 %
		Water absorption of insulation (Gravimetric)	IS 7098 (Part-1) (Cl.15.1.d v) IS 7098 (Part-2) (Cl.19.1 iiie) IS 1554 (Part-2) (Cl.18.1d8) IS 8783(Part-4) (Cl. 4.1, vi) IS14255 Table-1 vi IEC 60502-1 (Clause 18.13) IEC 60502-2 (Clause 19.13)	Up to 1 mg/cm ²
		Loss of mass for Insulation and Sheath	IS 1554 (Part-1) (Cl.15.1d 5) IS 1554 (Part-2) (Cl.18.1d 5)	Up to 2 mg/cm ²

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			IS 694 Table-1 c 2 & d 2 IS 7098 (Part-1) (Cl.15.1,e iii) IS 7098 (Part-2) (Cl.19.1vi e) IS 7098 (Part-3) (Cl.19.1 g iii) IEC 60840 (Clause 12.5) IEC 60502 (Clause 18.6) IEC 60502-2 (Clause 19.6) IEC 62067 (Clause 12.5)	
		Pressure Test at High Temperature / Hot Deformation	IS 1554 (Part-1) (Cl. 15.1d4) IS 1554 (Part-2) (Cl. 18.1d 4) IS 8783 (Part-4) (Cl. 4.1,viii) IS 694 Table-1 (c 6 & d 6) IS 7098 (Part-1) (Cl.15.1,e v) IS 7098 (Part-2) (Cl.19.1vi d) IS 7098 (Part-3) (Clause 19.1 g v & 3 iii) IEC 60840 (Clause 12.5) IEC 60502-1 (Clause 18.7) IEC 60502-2 (Clause 19.7) IEC 62067 (Clause 12.5)	Up to 50 %
		Heat shock Test	IS 1554 (Part-1) (Cl. 15.1d6) IS 1554 (Part-2) (Cl. 18.1d6) IS 8783 (Part-4) (Cl. 4.1, ix) IS 694 Table-1 c5 & d5 IS 7098 (Part-1) (Clause 15.1, e vi) IS 7098 (Part-2) (Clause 19.1 vi f) IS 7098 (Part-3) (Clause 19.1 g iv) IEC 60840 (Clause 12.5) IEC 60502-1 (Clause 18.9) IEC 60502-2 (Clause 19.9) IEC 62067 (Clause 12.5)	Qualitative

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		Thermal stability	IS 1554 (Part-1) (Cl. 15.1d7) IS 1554 (Part-2) (Cl. 15.1d7) IS 694 Table-1 c 7 & d 7 IS 7098 (Part-1) (Clause 15.1 e Vii) IS 7098 (Part-2) (Cl. 19.1 g) IS 7098 (Part-3) (Clause 19.1 g vii)	20 minute to 150 minute
		Carbon Black content	IEC 60502-1 (Table-20) IEC 60502-2 (Table-22) IEC 60840 (Clause 12.5) IEC 62067 (Clause 12.5) IS 7098 (Part-2) (19.1 Vi h) IS 7098 (Part-3) (Cl.19.1.3 i) IS14255	2.5 g ± 0.5 % (by mass)
		Cold Elongation, Cold Impact / Cold bend Test (Behavior in the low temperature)	IS 1554 P-1 (Cl.15.4a & b) IS 1554 Part 2 (Cl.18.4) IS 694 (Table1c8, 9d12, 13) IS 7098 (Part-1) (Clause 15.4 a, b) IS 7098 (Part-2) (Clause 19.4) IS 7098 Part 3-Clause 19.4 IEC 60840 (Clause 12.5.7) IEC 62067 (Clause 12.5.7) IEC 60502-1 (Clause 18.8) IEC 60502-2 (Clause 19.8)	Qualitative (-) 5 to 50°C
		Oxygen Index	IS 1554 (Part-1) (Clause 15.1.1 a) IS 1554 Part 2 (Cl.18.1.3 a) IS 694 (Table-1 c 11 & d 8) IS 7098 Part-1 (Cl. 15.1.1a) IS 7098 (Part-2) (Cl.20.10) ASTM D2863 & IS 10810-P-58 & 64	29 % to 45 %

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		Temperature Index	IS 1554 Part-1 (Cl.15.1.1 d) IS 1554 Part-2 (Cl.18.1.3 d) IS 694 (Table-1 c 12 & d 9) IS 7098 Part-1 (Cl. 15.1.1g) IS 7098 (Part-2) (Cl. 20.15)	Ambient to 600 °C
		Halogen acid gas evolution	IEC 60502-1 (Cl.18.14.5) IS 1554 Part-1 (Cl.15.1.1 f) IS 1554 Part-2 (Cl.18.1.3e) IS 694 (Table 1Cl.c 13 d 10) IS 7098-Part-1 (Cl.15.1.1 f) IS 7098 (Part-2) (Cl.20.13) IS 10810 Part-59 IEC 60754-1 & IEC 60754-2	Up to 20 %
		Smoke Density	IS 1554 Part-1 (Cl.15.1.1 e) IS 1554 Part-2 (Cl.18.1.3f) IS 694 (Table-1 c 14 d 11) IS 7098 Part-1 (Cl.15.1.1e) IS 7098 (Part-2) (Cl.20.14) ASTM D 2843 IS 13360(Part 6 / Section 9) IEC 61034-1 & IEC 61034-2	10 % to 80 %
		Flammability	IEC 60502-1 (Cl. 18.14) IEC 60502-2 (Cl. 19.14) IEC 60840 (Cl. 12.5.13) IEC 62067(12.5) IS 1554 Part-1 (Clause 15.1h & 15.1.1 b, c) IS 1554 Part-2 (Cl. 19.8, &18.1.1 b & c) IS 694 (Table-1 e5) IS 7098 Part-1 (Clause 15.1 h15.1.1 b,c) IS 7098 (Part-2) (Cl. 20.8, 20.11 & 20.12) IS 7098 (Part-3) (Cl.19.1h)	1 mm to 1000 mm and up to 2.5 m

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			IS 10810 Part-53, IS 10810 Part-62 IEC 60332-1 IEC 60332-10 IEC 60332-3-21 IEC 60332-3-22 IEC 60332-3-23 IEC 60332-3-24 IEC 60332-3-25	
		Dimension of armoring material	IS 10810 (Part-36)	0.01 mm to 25 mm
5.	MV Cables	Strippability on insulation screen	IS 7098 (Part-2) v a IEC-60502-2 (Cl-19.21)	1 N to 500 N
6.	MV/LV Cables	Tensile strength & Elongation at break of Steel armoured	IS 3975 IS 1554 (Part-1) (Cl. 15.1 b) IS 1554 (Part-2) (Cl. 18.1b) IS 7098 (Part-1) (Cl. 15.1 b) IS 7098 (Part-2) (Cl. 19.1 ii)	1 N to 21000 N 3.5 % to 25 %
		Mass of zinc coating on steel armour	IS 3975 IS 1554 (Part-1) IS 1554 (Part-2) IS 7098 (Part-1) IS 7098 (Part2) (Cl.19.1 ii)	0.01 mg to 200 g
		Uniformity of zinc coating on steel armour	IS 3975 IS 1554 (Part-1) (Cl.15.1 b) IS 1554 (Part-2) (Cl.18.1b) IS 7098 (Part-1) (Cl.15.1 b) IS 7098 (Part-2) (Cl.19.1 ii)	Qualitative
		Torsion Test, Adhesion & Wrapping test on steel armour	IS 3975 IS 1554 (Part-1) (Cl. 15.1 b) IS 1554 (Part-2) (Cl. 18.1b) IS 7098 (Part-1) (Cl. 15.1 b) IS 7098 (Part-2) (Cl.19.1 ii)	Qualitative